

Use of HAZUS-MH to Support Individual Assistance Program

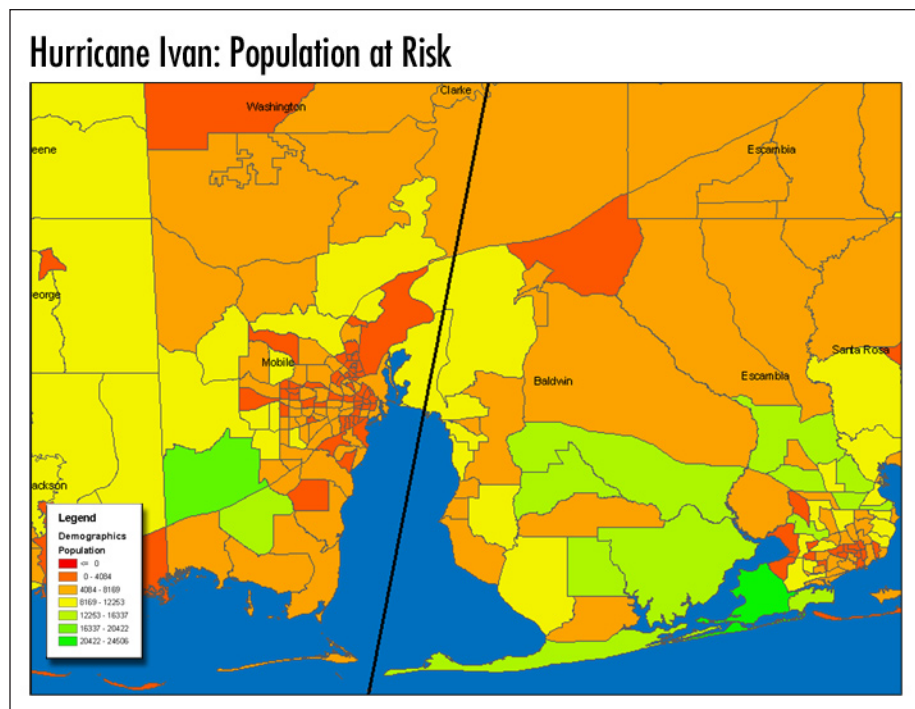
Since the late 1990's, HAZUS has been used to support analysis of shelter requirements, displaced households, and residential losses from earthquakes, floods and hurricanes. This analysis has important potential applications for FEMA's Individuals and Households Program (IHP).



Potential applications include:

- Analysis of exposure of population to hazard impacts (hurricane winds, storm surge, ground shaking).
- Estimates of the number of IA Preliminary Damage Assessment Teams required for a disaster.
- Estimates of expected residential damage
- Estimates of short-term shelter requirements.
- Estimates of the number of displaced households.

Exposure of Population to Hazard Impacts



HAZUS-MH can be used to identify the population at risk from the disaster. During Hurricane Ivan in 2004, FEMA used HAZUS-MH in briefings with Alabama Emergency Management Agency and Florida's State Emergency Response Team (SERT) to estimate the number of households at greatest risk from hurricane winds and storm surge. The analysis included estimates of households in the high risk area with low incomes (and potentially with greatest need for FEMA housing assistance).

< [View larger graphic.](#) >

Individual Assistance Preliminary Damage Assessment Teams

In the aftermath of a major disaster, an Individual Assistance PDA is carried out by PDA teams to "identify the impact, type and extent of disaster damages and to determine the impact on individuals while identifying the resources needed to recover" (Preliminary Damage Assessment for Individual Assistance Operations Manual, 9327.1-PR).

FEMA’s Human Services Preliminary Damage Assessment (PDA) methodology identifies four damage states: Affected, Minor, Major and Destroyed. The table below provides the damage states/definitions under the Human Services PDA.

PDA Damage State Definitions

Destroyed – structure is a total loss or damaged to such an extent that repairs are not economically feasible. Any one of the following may constitute a status of destroyed:

- Repair of structure is not economically feasible;
- Structure is permanently uninhabitable;
- There is a complete failure of major structural components (collapse of walls or roof);
- Unaffected structure will be required to be removed or demolished due to ordinance (e.g., beachfront homes removed due to severe beach erosion).

Major – structure has sustained structural or significant damage, is uninhabitable and requires extensive repairs. Any of the following may constitute major damage:

- Substantial failures to structural elements of the residence (e.g., walls, floors, foundations);
- Damage to the structure exceeds the Disaster Housing Program, Home Repair Grant maximum (\$10,000);
- General exterior property damage exceeds the Disaster Housing Program Home Repair Grant maximum (e.g., roads and bridges, wells, earth movement) and has more than 50% damage to the structure.
- Damage will take more than 30 days to repair.

Minor – structure is damaged and uninhabitable, but may be made habitable in a short period of time with home repairs. Any of the following may constitute minor damage:

- Structure can be repaired within 30 days;
- Structure has more than \$100 of eligible habitability items through the Disaster Housing Program, Home Repair Grant; has less than \$10,000 of eligible habitability items through the Disaster Repair Program, Home Repair Grant.
- Damage repair costs are less than 50% of total value of house.

Affected – structures sustain some damage to structure and contents but which are habitable without repairs, and damage to habitability items is less than Disaster Housing Program, Home Repair Grant minimum.

The table below shows how the definitions of damage states used by FEMA Human Services in the PDA match up with HAZUS-MH residential damage states. During the 2004 and 2005 hurricane seasons, FEMA ESF #5 (Emergency Planning) used HAZUS-MH to provide Human Services representatives with estimates of damages to residential structures.

<u>Human Services PDA</u>		<u>HAZUS-MH Damage States</u>
Affected	=	Very Minor Damage and Minor Damage
Minor Damage	=	Moderate Damage
Major	=	Severe
Destroyed	=	Destruction

HAZUS-MH can be used to complement other tools that are used by FEMA to assess disaster impacts. It is most valuable as a preliminary assessment tool for *establishing the parameters of disaster damages*. For hurricanes, HAZUS-MH can roughly delineate hurricane wind fields, concentrations of population, and the location of residential building stock – including manufactured housing.

Expected Residential Damage

A key determinant of the nature and duration of disaster recovery is the status of housing.

Under FEMA's Individual Assistance Technical Assistance Contract (IA-TAC), an essential element of information is impact of the disaster on the housing inventory, and the ability of the locality and state to effectively provide housing solutions for the impacted population.

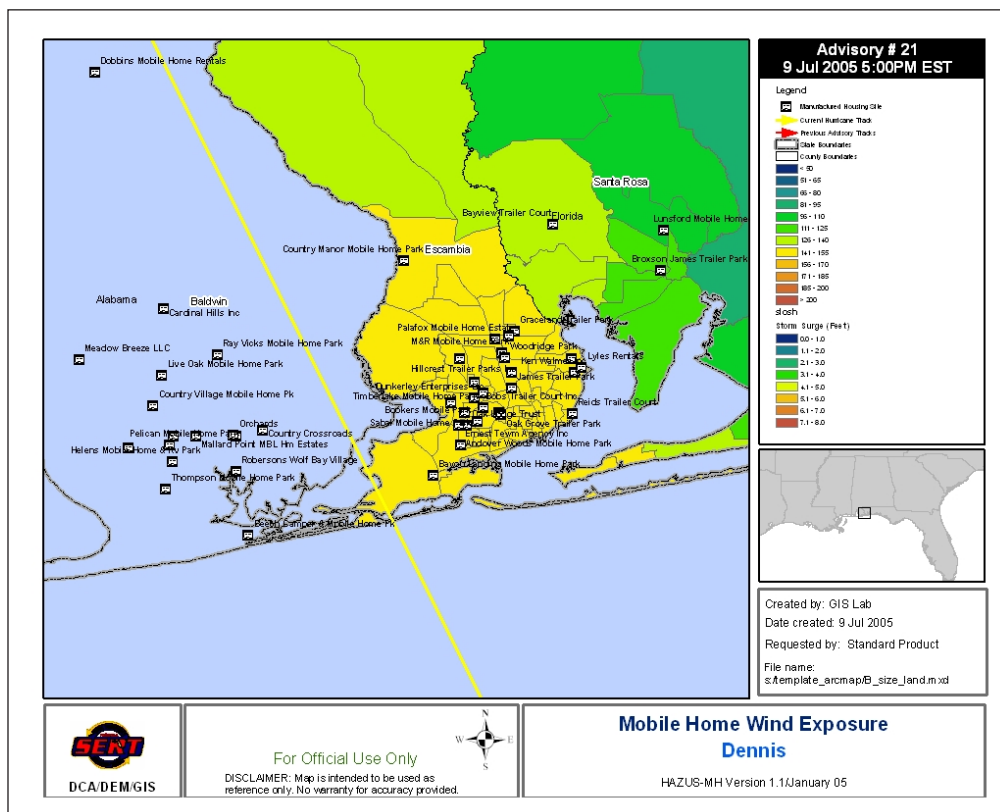
HAZUS-MH can be used to support this mission. The model estimates building damage by occupancy, which includes, residential. Losses could be expressed in terms of physical characteristics (no damage, minor, moderate, extensive/severe, and destroyed/collapse) or in monetary terms.

The **Residential Damage** analysis has several applications. It can be used to:

- Identify specific manufacture housing communities that are most vulnerable to high winds and storm surge, and are high probability candidates for Individual Assistance.
- Scale mission requirements for post-disaster Housing Inspections.
- Identify communities and neighborhoods most likely to sustain at least moderate wind damage, information that can serve as input to Logistics planning (staging areas, mobile kitchens, etc.).
- Analyze demographic characteristics of impacted population (income, ethnicity) in conjunction with residential losses to further identify Individual Assistance requirements.

The Florida SERT used HAZUS-MH during response to Hurricane Dennis to assess the exposure of manufactured housing in the Florida panhandle to hurricane winds. Manufactured housing is highly vulnerable to high winds. This output is routinely used by the SERT to identify potential requirements for housing assistance.

< [View larger graphic.](#) >



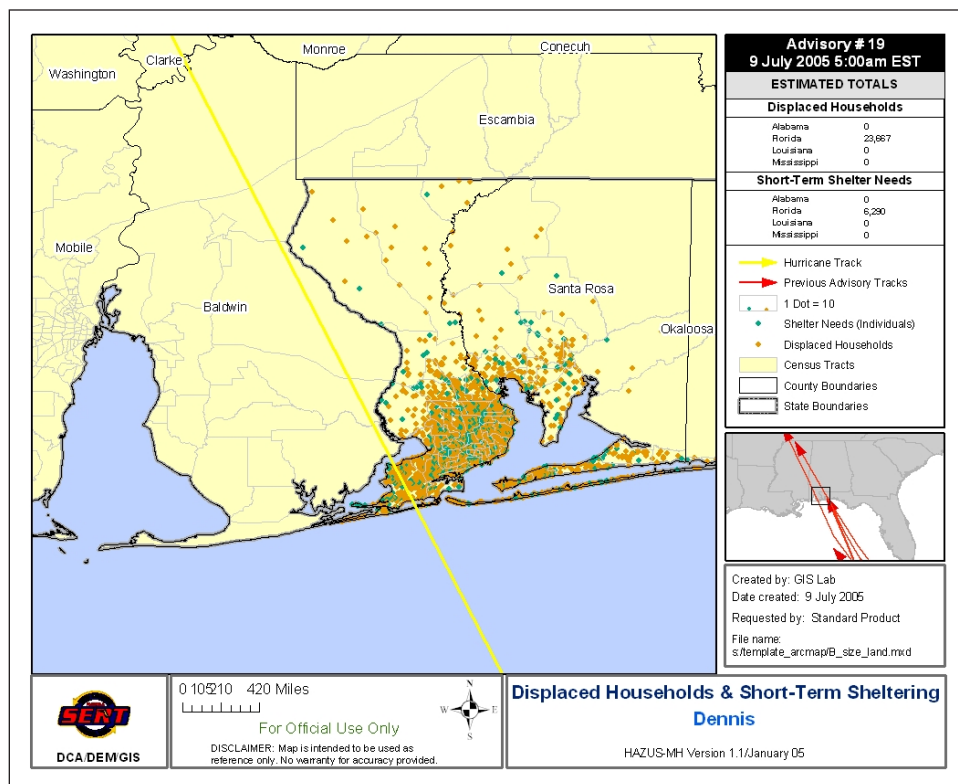
Estimates of Shelter Requirements

One of the strengths of HAZUS-MH, measured by the accuracy of the analysis (how predicted estimates of losses match with actual losses), is the estimates of shelter requirements.

For sheltering requirements, HAZUS-MH estimates: 1) Number of households that are displaced due to structural damage to their residence from wind; and 2) Number of people who require short-term public shelter due to hurricane winds.

During the hurricanes, the analysis of estimated shelter requirements and displaced households was distributed to FEMA (Human Resources/ Individual Assistance) and the American Red Cross (ESF#6 – Mass Care).

- In Hurricane Ivan, the HAZUS-MH estimate of the number of people requiring short-term public shelters in Florida was 15,000 to 40,000. The actual number of people who went to public shelters was 28,000.
- In Hurricane Charley, the HAZUS-MH estimate for short-term public shelter was 5,000 (Advisory 22). The actual number was 5,400 (August 14, Source: American Red Cross).
- In Hurricane Frances, the HAZUS-MH estimate for short-term public shelter was 1,564. The actual number was 1,250 (Source: American Red Cross).



< [View larger graphic.](#) >

Use of HAZUS in Hurricane Dennis for Shelter Estimates

In summary, HAZUS-MH can play an important role in support of decisions on the implementation of FEMA's Individual Assistance program. Effective use depends on the following:

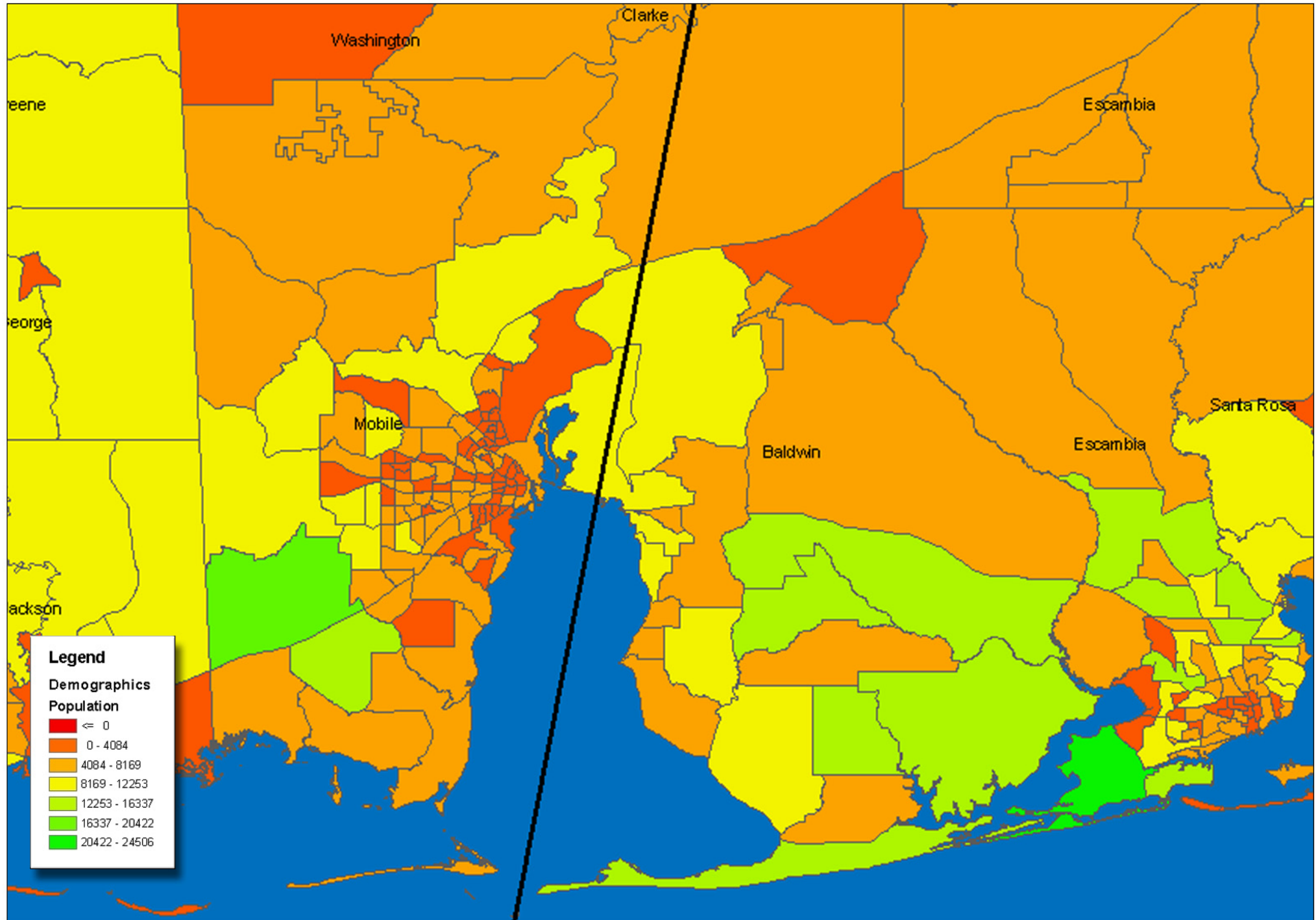
- Capable operator(s) of HAZUS-MH who understand the potential applications of HAZUS-MH, as well as the limitations and uncertainties of the model; and
- Knowledgeable personnel in Human Services, American Red Cross and other organizations who are positioned to use the model in pre- and post-disaster analyses.



FEMA

For more information, visit:
www.fema.gov/plan/prevent/hazus

Hurricane Ivan: Population at Risk



Advisory # 21 9 Jul 2005 5:00PM EST

Legend

- Manufactured Housing Site
- Current Hurricane Track
- Previous Advisory Tracks
- State Boundaries
- County Boundaries

- < 30
- 31 - 65
- 66 - 80
- 81 - 95
- 96 - 110
- 111 - 125
- 126 - 140
- 141 - 155
- 156 - 170
- 171 - 185
- 186 - 200
- > 200

slosh

- Storm Surge (Feet) 0.0 - 1.0
- 1.1 - 2.0
- 2.1 - 3.0
- 3.1 - 4.0
- 4.1 - 5.0
- 5.1 - 6.0
- 6.1 - 7.0
- 7.1 - 8.0

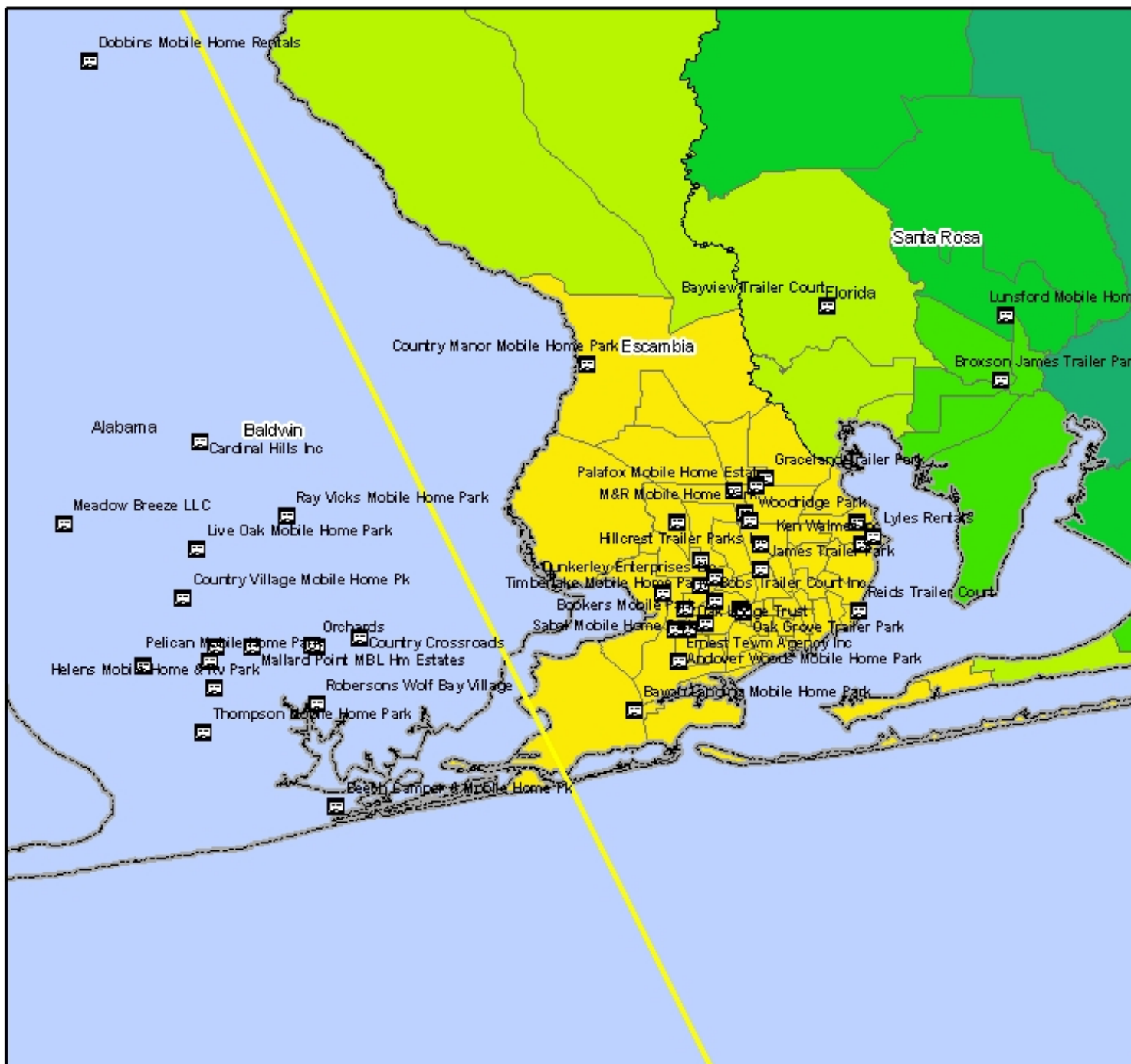


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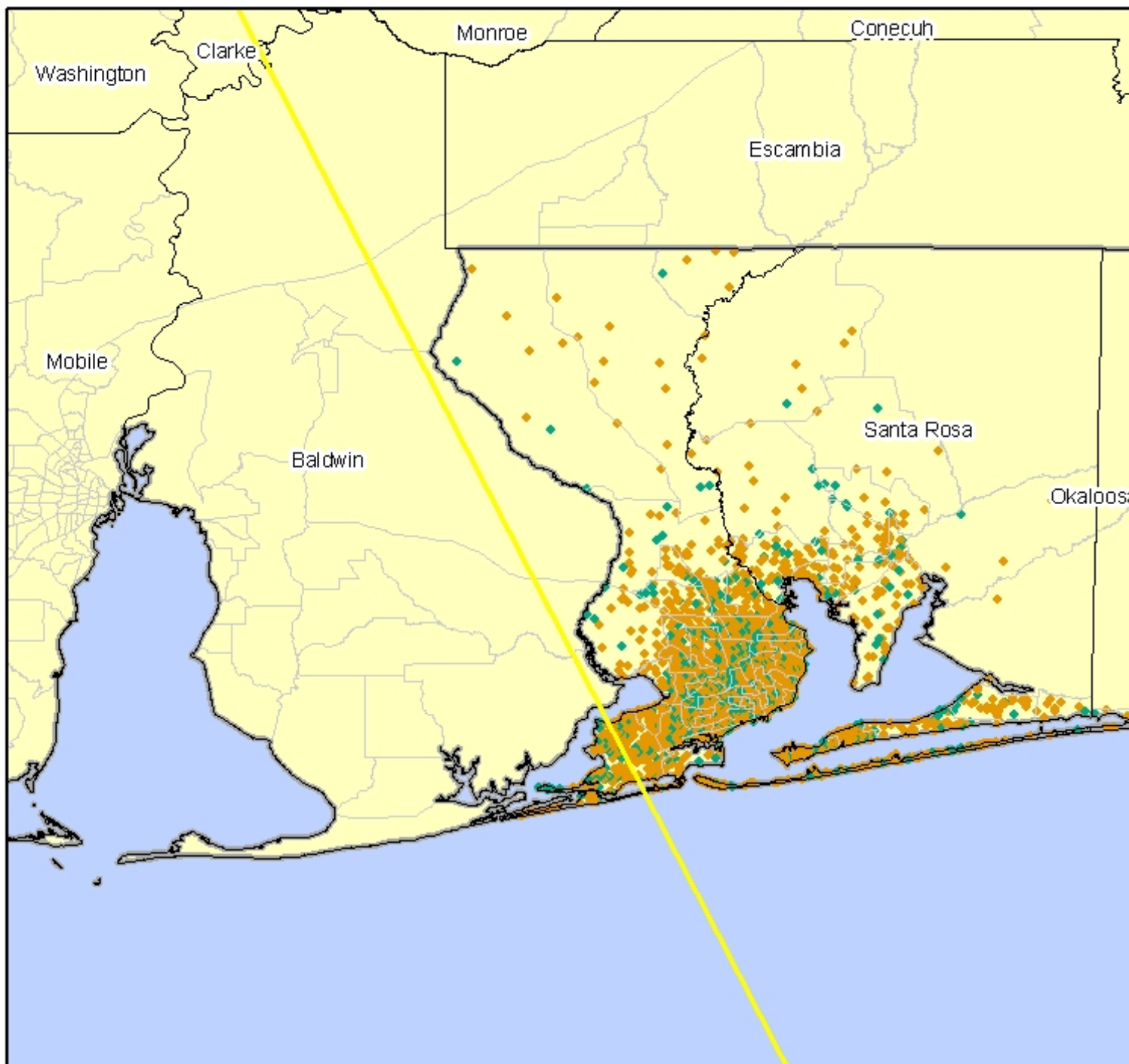
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Mobile Home Wind Exposure Dennis

HAZUS-MH Version 1.1/January 05



Advisory # 19
9 July 2005 5:00am EST

ESTIMATED TOTALS

Displaced Households

Alabama	0
Florida	23,667
Louisiana	0
Mississippi	0

Short-Term Shelter Needs

Alabama	0
Florida	6,290
Louisiana	0
Mississippi	0

- Hurricane Track
- Previous Advisory Tracks
- 1 Dot = 10
- Shelter Needs (Individuals)
- Displaced Households
- Census Tracts
- County Boundaries
- State Boundaries



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DCA/DEM/GIS

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Displaced Households & Short-Term Sheltering
Dennis

HAZUS-MH Version 1.1/January 05